

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listing of claims in the application.

Listing of Claims

1. (Original) An IO-requesting method of issuing an IO request to a storage apparatus of a computer system by execution of a program in said computer system, wherein a program identifier set in advance in said program and a request address are applied to a first function for inputting two values to generate one value used as a new address with said program identifier appended thereto, and said IO request is issued by using said new address.

2. (Original) A computer executing a first program issuing an IO request to a storage apparatus and a second program for collecting said IO request and transmitting said IO request as an IO command to said storage apparatus wherein:

a program identifier set in advance in said first program and a request address are applied to a first function for inputting two values, that is, said program identifier and said request address, to generate one value used as a new address with said program identifier appended thereto, and said IO request is issued by using said new address;

said second program has a table associating a program identifier, a logical volume existing in said storage apparatus and a network address with each other; and

if said IO request is an IO request issued to a logical volume existing in said storage apparatus as a logical volume prescribed to be a protected logical volume, a second function for carrying out an operation to input one value for generation of two output values as an operation inverse to that of said first function generates an original request address and a program identifier, that is, said two output values, from said one input value, that is an address specified in said IO request as said new address, said table is searched for a network address associated with said generated program identifier and a logical volume indicated by said generated original request address and a communication with said storage apparatus is carried out by using said network address as an address of a transmission originator in order to issue an IO

command to said original request address.

3. (Original) A computer system comprising one or more computers and one or more storage apparatus connected to said computers by a network apparatus wherein:

in each of said computers:

a first program issuing an IO request to a storage apparatus and a second program for collecting said IO request and transmitting said IO request as an IO command to said storage apparatus are executed;

a program identifier set in advance in said first program and a request address are applied to a first function for inputting two values, that is, said program identifier and said request address, to generate one value used as a new address with said program identifier appended thereto, and said IO request is issued by using said new address;

said second program has a table associating a program identifier, a logical volume existing in said storage apparatus and a network address with each other; and

if said IO request is an IO request issued to a logical volume existing in said storage apparatus as a logical volume prescribed to be a protected logical volume, a second function for carrying out an operation to input one value for generation of two output values as an operation inverse to that of said first function generates an original request address and a program identifier, that is, said two output values, from said one input value, that is an address specified in said IO request as said new address, said table is searched for a network address associated with said generated program identifier and a logical volume indicated by said generated original request address and a communication with said storage apparatus is carried out by using said network address as an address of a transmission originator in order to issue an IO command to said original request address, and

on the basis of said network address used as an address of a transmission originator, said network apparatus determines whether or not a communication with said storage apparatus can be carried out.

4. (Original) A computer system according to claim 3 wherein, in place of said

network apparatus, said storage apparatus determines whether or not an access to a logical volume existing in said storage apparatus can be made.

5. (Original) An access control method adopted for a storage apparatus, said method comprising the steps of:

recognizing a received IO command as an IO command issued to a logical volume existing in said storage apparatus as a logical volume prescribed to be a logical volume protected from a received IO command;

using a second function for inputting one value to generate two output values as a function for obtaining a second address and a program identifier, that is, said two output values, from said one value, that is, a first address specified in said IO command;

determining whether or not an access to said logical volume can be made on the basis of said program identifier and an association table; and

replacing said first address specified in said IO command with said second address and processing said IO command in case an access by using said IO command is determined to be an access that can be made,

wherein said association table is provided as a table for associating a logical-volume identifier with a program identifier for identifying a program allowed to make an access to a logical volume identified by said logical-volume identifier.

6. (Original) An access control method adopted for a storage apparatus, said method comprising the steps of:

recognizing a received IO command included in a packet transmitted through a network as an IO command issued to a logical volume existing in said storage apparatus as a logical volume prescribed to be a logical volume protected from a received IO command;

using a second function for inputting one value to generate two output values as a function for obtaining a second address and a program identifier, that is, said two output values, from said one value, that is, a first address specified in said IO command;

determining whether or not said packet can be transferred to said storage apparatus on

the basis of said program identifier and an association table; and

replacing said first address specified in said IO command with said second address and transmitting said packet in case an access by using said IO command is determined to be an access that can be made,

wherein said association table is provided as a table for associating a storage-apparatus identifier for identifying said storage apparatus, a logical-volume identifier for identifying a logical volume existing in said storage apparatus and a program identifier for identifying a program allowed to make an access to said logical volume identified by said logical-volume identifier with each other.